

The demand for global and local environmental protection – experimental evidence from climate change mitigation in Beijing

Appendix 1: Sampling and Grouping

1. Sampling

In order to have representative sample of Beijing local residents, the sampling procedure design is based on the following facts.

- 1) according to the population density distribution data from Beijing Statistical Agency, over 50% of the total citizens in Beijing live within the 5th ring road, in the six districts namely Dongcheng, Xicheng, Chaoyang, Haidian, Fengtai and Shijingshan.
- 2) the neighborhood committee (*juweihui*, introduction can be found in this Appendix below) was used as the targeted spot and communication hub. There are 1,500 neighborhood committees within the total sample, consisting of over 330 thousand households (details about each committee are purchased from a consulting company).
- 3) In order to minimize the cost, we use the clustering method to send invitations: a. randomly select 100 neighborhood committees (controlling for size); b. for each neighborhood committee, choose randomly of the building and the corridor (adjusted for size); c. for chosen corridor, send invitation letters one household by another (i.e., survey-type in the last step). Thereby, we follow as closely as possible Gan et al. (2014) (see the first section regarding "survey design") to proceed the invitation. The key idea is to make the whole process as random (and representative) as possible, so that we may be able to mirror the age and gender structure for Beijing population.
- 4) before the formal delivery, the research team carried a trial delivery of 100 invitations in the randomly selected neighborhood committees, and got 3 feedbacks, which indicated the appropriate feedback rate was about 3%. In order that we get enough respondents (say, 200-300) and taking into account relatively low feedback rate, 8,000 households are selected.¹⁹

2. Grouping

After a 6-day delivery of 8,000 invitation letters, and a careful selection of the participants, we got 317 registered subjects for our eleven sessions (see Invitation letter and the timetable of sessions in next section of this Appendix), with 64% of female and average age of 41 years-old (and the median is 36 years-old). The average size of each session is 28.

Invitation letter

For randomly chosen household in the municipal area of Beijing

Subject: Invitation to a scientific study with payment

Dear Madam/Sir,

University of International Business and Economics (UIBE) in Beijing is a top-ranking University in China, which carries out research activities such as applied economic research. At the moment, UIBE is conducting a scientific study for which we are looking for participants. For this purpose we want to invite you.

For the participation in a study, which takes approximately 60-90 minutes, you get paid out 300 RMB in cash. Within the study you have the opportunity to make buying decisions. For the buying decision rules are in force, which are established by the staff of the UIBE as well as the group of participants. You can take home – depending on your buying decisions as well as the buying decisions of the other participants – up to 300 RMB. Only the team of scientists get to know your identity, whereas your data are treated strictly confidential and in compliance with the data privacy act. Money amount, which you possibly paid for your purchase, are paid at the end of the study.

Please take into consideration the following prerequisites for taking part in the study:

- Enrollment by phone or email,
- Residence in Beijing (Proof, e.g. ID),
- Native Chinese,
- Age between 18 and 75,
- On time appearance at the chosen appointment and present this letter and your ID.

For the case that you want to take part in this study and you fulfill the above-named prerequisites, we ask you to choose one of the appointments on the back page and to enroll by phone. It is also possible to contact us by using the email address GLCE@uibe.edu.cn. Afterwards, we get in touch with you. The selection of the participants is according to scientific criteria. The study is conducted at the UIBE in Beijing. We are available for further questions by calling the phone number 010-64494361 between Feb. 17 and Feb. 25, 2017 (Monday to Friday from 13:00-17:00) as well as by email.

We would be pleased to welcome you to our study.

Yours truly,

Appointment (Weekday/Weekends, date, time)

	Morning	Afternoon		Evening
11 March (Sat.)	10:00-11:30	1:00-2:30	3:00-4:30	6:00-7:30
12 March (Sun.)	10:00-11:30	1:00-2:30	3:00-4:30	6:00-7:30
13 March (Mon.)	10:00-11:30		3:00-4:30	

Enrollment:

Please call the number 010-64494361 between 1:00 and 5:00 pm during the weekdays from Feb. 17 to Feb. 25, 2017 (Monday to Friday) or enroll via sending email to the address GLCE@uibe.edu.cn. Please name an appointment (see above) at which you want take part at the study. Your name is written down during the enrollment process – however, as stated above it is not published or passed on a third party. Please note that you cannot claim to participate at the study by with the receipt of this letter. The selection of the participants is according to scientific criteria.

The location of UIBE



UIBE locates between 3rd and 4th Ring in Northeast Beijing, with China Daily to its west, China-Japan Friendship Hospital to its south, Sinopec to its north, and Shaoyaoju to its east. Many bus lines pass the west gate of UIBE, such as line 62, line 409, line 807, line 422, line 847, line 406, line 713, line 419, line 361, line 18, and line 379, among others. Alternatively, one can take subway line 5 or line 10 and get off at Huixinxijie Nankou Station, and using the exit B or C and another 15min walking to UIBE; or line 10 or line 13 and get off at Shaoyaoju Station, and taking exit B or A, then 10min walking to UIBE.

Information about UIBE

The University of International Business and Economics (UIBE), founded in 1951, is a multi-disciplinary and national key university with economics, management, law, literature and science as its

core academic areas of expertise. Since its foundation, UIBE has been steadfast in living up to its motto of "Erudition, Honesty, Endeavor and Perfection" through constant diligence and innovation.

At present, UIBE consists of 15 academic schools, a Graduate School, a Department of Physical Education and a Department of Culture and Art, offering over 1405 undergraduate courses, 875 postgraduate courses, and 109 doctoral courses.

UIBE plays a leading role in the development of international alliance with universities around the world. Currently, UIBE has established partnerships with over 160 overseas universities and international organizations. You will find additional information about UIBE on our homepage <http://www.uibe.edu.cn>.

Introduction of *Juweihui*

The neighborhood committees or the resident committees — aka *juweihui* (居委会) — arose as "autonomous urban grassroots civil organizations" in the 1950s. The first neighborhood committees were found in the urban area and then in rural area of China in 1980s. *Juweihui* are the lowest level of government in charge of civil affairs. They help the government to enforce such policies as family planning, mobile population management, crime prevention and census administration.

Nowadays, *juweihui* also undertake tasks such as organizing free hobby classes; coordinating secondhand exchange markets; removing illegal advertisements; ensuring sanitation; and organizing volunteers to care for the elderly and those living with physical or mental disabilities. One of their important responsibilities is to distribute social security and welfare to low-income households, people with disabilities and the unemployed.

Normally, each *juweihui* is responsible for 100-700 families in the neighborhood. There are 2,932 *juweihui* in Beijing, according to the data released in 2015.

Letter of understanding

Thanks for your support and participation in the research conducted by the University of International Business and Economics, which is funded by the National Natural Science Foundation of China and other research grants. Please read the following carefully before you participate in the study. If you have any questions, please contact our staff.

The study lasts about 1-1.5 hours. During the course of the study, you will need to complete the survey questionnaire and make a voluntary decision based on the rule setting out in the research. Our findings will be based on your consumer decision and final payment behavior. Throughout the research process, all your decisions are made on a voluntary basis. Your personal information and decision data will be kept strictly confidential.

We will provide 300 RMB of research subsidies for the related expenses such as the transportation expenses you are involved in.

Thanks again for your support and participation!

I have read this letter and have understood the terms of the study, and I voluntarily participate in the study regarding consumer decision making and will complete the questionnaire.

Signature of the participant: University of International Business and Economics

Date:

Appendix 2: Instructions and questionnaires

Welcome at UIBE!

We are looking forward to your participation in our survey. Your opinion and personal assessment of a number of issues in consumption behavior is very important for us. Thank you in advance for your cooperation.

In this document you find all necessary information for the event. During the event you can go back in the document at any time.

Do not go ahead when you see the STOP sign! Please turn over this page only when we tell you to do so. Please read the instructions carefully. Do not talk to other participants.

We promise that your individual information is treated confidential.

Questionnaire I

Please answer to the following questions.

(If necessary variables and/or numeric codes are **marked**.)

A01

Taking all things together, how happy are you these days? Please tick a box on the scale, where the value 1 means: 'not at all happy' and the value 10 means: 'very happy'.

1	2	3	4	5	6	7	8	9	10
<input type="radio"/>									

A02

All in all, how would you describe your state of health these days? Please tick a box on the scale, where the value 1 means: 'poor' and the value 10 means: 'very good'.

1	2	3	4	5	6	7	8	9	10
<input type="radio"/>									

A03

All things considered, how satisfied are you with your life as a whole these days? Please tick a box on the scale, where the value 1 means: 'completely dissatisfied' and the value 10 means: 'completely satisfied'.

1	2	3	4	5	6	7	8	9	10
<input type="radio"/>									

A04

Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? Please tick a box on the scale, where the value 1 means: 'unwilling to take risks' and the value 10 means: 'fully prepared to take risks'.

1	2	3	4	5	6	7	8	9	10
<input type="radio"/>									

A05

Are you generally concerned about human-induced climate change?

Not concerned 1	Rather not concerned 2	Rather concerned 3	Concerned 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

A06

Are you generally concerned about local air pollution caused by pollutants like for example particulate matter (PM2.5 and PM10), sulfur dioxide, nitrogen dioxide or ozone?

Please tick a box for the scale of your concern about local air pollution in the two selected regions, namely North (including Beijing) and South (including Shenzhen).

	Not concerned 1	Rather not concerned 2	Rather concerned 3	Concerned 4
North (including Beijing) A06_01	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
South (including Shenzhen) A06_02	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

A07

How would you describe your knowledge about the following topics?

	Poorly informed 1	Rather poorly informed 2	Rather well informed 3	Well informed 4
Regarding climate change I am ... A07_01	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regarding emissions trading I am ... A07_02	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regarding local air pollution I am ... A07_03	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

General information

Today, we will offer you a certain product to purchase. In a few minutes you will learn which product it is and how the sale will be conducted.

As we want to assess whether you want to purchase the product, we would like to ask you not to talk to the other participants.

If you have any questions please do not hesitate to contact us.

Rules of purchase

No one except for the UIBE team will learn about your statements from the event.

The process of sale can be explained in three steps:

i) Introduction of the product

Before we ask you to make a purchase decision, we will briefly introduce the product to you.

ii) Decision to buy for different prices

You will receive different prices for one unit of the product. For each price you can indicate whether you are willing to buy or not (there is **no obligation to buy**).

iii) Payment

After the decision and after the second questionnaire, one price is randomly selected and the transaction is realized. Please note: If you **purchase the product**, you will have to use your **own money**.

In a moment, we will go over a quick example with you.

Please note:

With these rules of purchase it is **in your own interest** to purchase the product only in case you **actually want to buy** at the respective price.

Comprehension Test

We will now carry out a short test to check whether you have fully understood the rules of purchase. Please let us know, when you have finished answering all questions (i.e. ticked the corresponding box) and we will come to you.

Imagine a participant is willing to pay up to **70 RMB** for the product. He has to decide whether to purchase or not the product for the following six prices. After the decisions one price is randomly selected and the transaction is realized for this price. Please indicate in the table below how the participant should decide in situation 1 below.

Situation 1		Purchase	
#	Price (in RMB)	YES	NO
1	100	<input type="radio"/>	<input type="radio"/>
2	80	<input type="radio"/>	<input type="radio"/>
3	60	<input type="radio"/>	<input type="radio"/>
4	40	<input type="radio"/>	<input type="radio"/>
5	20	<input type="radio"/>	<input type="radio"/>
6	10	<input type="radio"/>	<input type="radio"/>

Now assume, a participant is willing to pay up to **30 RMB** for the product. Please indicate how the participant should decide in situation 2 below.

Situation 2		Purchase	
#	Price (in RMB)	YES	NO
1	100	<input type="radio"/>	<input type="radio"/>
2	80	<input type="radio"/>	<input type="radio"/>
3	60	<input type="radio"/>	<input type="radio"/>
4	40	<input type="radio"/>	<input type="radio"/>
5	20	<input type="radio"/>	<input type="radio"/>
6	10	<input type="radio"/>	<input type="radio"/>

Please answer the following questions:

1. What should I do in case I do not want buy the product at all?

- I indicate "Yes" for all prices.
 I indicate "No" for all prices.
 I only indicate "Yes" for the price 10 RMB.

2. How many prices will be randomly selected in each situation?

- 2 prices
 5 prices
 1 price

Information on Climate Change

Please read the information provided on this page carefully.

You have about 10 minutes to do so.

Global climate change is seen as a serious environmental problem faced by mankind. Human influence on the climate system is clear: mankind largely contributes to climate change by emitting greenhouse gases, especially carbon dioxide (CO₂). CO₂ originates mainly from burning of fossil fuels like coal, oil or natural gas in industrial processes and energy production, or combustion engines of cars and lorries. CO₂ is a global pollutant, i.e. each quantity unit of CO₂ emitted has the same effect on the climate regardless of the location where the emission has occurred. Fossil fuel and biofuel combustion is also a very important man-made source of air pollutants like particulate matter (PM_{2.5} and PM₁₀), sulfur dioxide, nitrogen dioxide or ozone with more localized effects.

Without additional efforts to reduce greenhouse gases emissions beyond those in place today, global mean surface temperature is expected to increase in 2100 in the range from 3.7°C to 4.8°C above the pre-industrial average.

There are several consequences from rising temperatures. The most important consequences are stated below:

1. **Extreme weather events** like extreme heat waves, strong rainfalls and tropical storms are likely to become more frequent. Higher damages due to extreme weather events are expected.
2. The oceans will continue to warm and acidify, and global mean sea level to rise. For the period 2081–2100 relative to 1986–2005, the rise will likely be in the ranges of 0.26 to 0.82 m. Thus, low lying coastal regions may be threatened by **floods**. Sea level rise will not be uniform across regions.
3. The **consequences of climate change** will **vary regionally** resulting in substantial consequences for example in agriculture. Countries in the south which today are already hot and dry will become even hotter and dryer. Especially African countries will have to expect lower crop yields.
4. In **China** the following effects can be expected: The agricultural system may become more vulnerable and food security will be threatened. Coastal cities such as Guangzhou, Shanghai, and Tianjin will face the threat of flooding.

In order to mitigate climate change, **reducing CO₂ emissions** is necessary. Abatement of CO₂ is costly. Reducing CO₂ emissions, however, can be associated with significant **co-benefits** from reduced emissions of local air pollutants and related human health and ecosystem impacts.

Sources used:

Intergovernmental Panel on Climate Change (IPCC 2014, AR5)

World Energy Outlook, Energy and Air Pollution (2016)

Information on Beijing Emissions Trading System (Note: in T-BJ)

Please read the information provided on this page carefully.

You will have about 10 minutes to do so.

In 2013 Beijing, together with six pilot provinces/cities (Shanghai, Tianjin, Chongqing, Shenzhen, Guangdong and Hubei), has implemented the emissions trading system (ETS) for carbon dioxide (CO₂). Emissions trading is one of the instruments of climate policy in China. It follows a simple principle: National Development and Reform Commission (NDRC), jointly with Beijing (and other pilot cities), has determined the amount of CO₂ to be emitted altogether in the respective sectors (energy production and energy intensive industries). This total amount will be distributed to the companies in the form of emission rights ("**certificates**" or "**permits**"). For each quantity unit of CO₂ emitted, the company has to give a certificate to the ETS. The certificates can be traded between companies.

For each quantity unit of CO₂ emitted e.g. by a power plant, the plant operator has to prove his permission to do so in the form of a certificate. This leads to an important consequence: If the **total amount** of certificates is **reduced**, the **total emissions** will be **lower**, simply because plant operators do not possess enough emission allowances. That means if a certificate for one quantity unit is obtained from the market and is being "**retired**" (i.e. deleted) **the total CO₂ emissions are reduced by exactly this quantity amount**. The opportunity to retire certificates actually exists in the framework of the Emissions Trading System of Beijing. The NDRC regulates emissions trading and holds a **retirement account**. If certificates are transferred to this account they will be withdrawn from circulation, i.e. deleted, by the end of each year and can no longer be used by the companies.

Emissions trading has one central advantage: It guarantees that the abatement of CO₂ emissions occurs where it is the cheapest. Companies with opportunities to abate carbon dioxide at lower costs will do so and sell their certificates on the market, whereas companies with high abatement costs can acquire certificates at a relatively low price. This trade is beneficiary for both sides and guarantees for the emission reduction target to be achieved at minimal costs. The abatement of CO₂ emissions in the Beijing emissions trading system is likely to deliver also local air quality **improvements** as facilities become more energy efficient or switch to cleaner fuels.

Altogether, Beijing energy producers and energy intensive industries were allowed to emit about **45 million tons of CO₂** in the year 2014. As a benchmark: **global / China CO₂ emissions** per year amount for **32.000 / 9.000 million tons of CO₂**.

Summarizing, it can be stated that if the **total amount** of certificates in the Beijing Emissions Trading System is **reduced**, the **total CO₂ emissions** in Beijing **decrease** affecting also local air pollution.

Purchase of CO₂ Certificates (Note: in T-BJ, high price vector)

You are given the opportunity to **reduce one ton of CO₂ emissions in Beijing** by buying one certificate of the Beijing Emissions Trading System at this event. Thus, you have the opportunity to contribute to the reduction of the actual CO₂ emissions in Beijing.

The total amount of certificates purchased will be published on the UIBE website (no names or individual purchases will be published). UIBE will buy the amount of certificates chosen and will retire them.

The product is 1 ton of CO₂.

In the table below you see **6 prices for one CO₂ certificate in Beijing**. Please indicate for each price whether you are willing to buy or not. After the decisions and after the second questionnaire, **one price** is randomly selected and the transaction is realized, i.e. **one ton of CO₂ in Beijing is deleted**.

Important note:

There is no obligation to buy! Certificates purchased by you have to be paid!

# Pnumber	Price (in RMB) P	Purchase buy	
		YES 1	NO 0
1	300	<input type="radio"/>	<input type="radio"/>
2	100	<input type="radio"/>	<input type="radio"/>
3	45	<input type="radio"/>	<input type="radio"/>
4	27	<input type="radio"/>	<input type="radio"/>
5	14	<input type="radio"/>	<input type="radio"/>
6	5	<input type="radio"/>	<input type="radio"/>

Questionnaire II (Note: in T-BJ, high price vector)

Please answer the following questions.

B00

We would like to know what you expect regarding the purchase decision of all other subjects in the room. Please indicate the expected proportion of all other subjects who purchase at the given price.

Example: If all other subjects purchase at a given prices, this makes 100%. If the half of all other subject purchase at a given price, this makes 50%.

#	Price (in RMB)	Purchase of all other participants (in %)
1	300	
2	100	
3	45	
4	27	
5	14	
6	5	

B01What do you think is the recent price for CO₂ certificates in the Beijing emissions trading scheme?

RMB	I don't know
—	<input type="radio"/>

B02

Please indicate how sure you are regarding your price estimate above?

Not sure 1	Rather unsure 2	Rather sure 3	Sure 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

B03Do you trust in the ability of the Beijing emissions trading scheme to limit CO₂ emissions?

Not at all 1	I rather do not trust 2	I rather trust 3	I trust 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

C01

Please indicate how you most commonly commute within the city?

Driving alone with vehicle 1	<input type="radio"/>
Carpooling/carsharing 2	<input type="radio"/>
Driving with motorcycle 3	<input type="radio"/>
Driving with electric bicycle 4	<input type="radio"/>
Park and ride 5	<input type="radio"/>
Public transport 6	<input type="radio"/>
Taxi 7	<input type="radio"/>
Cycling 8	<input type="radio"/>
Walking 9	<input type="radio"/>

C02

Please indicate how many hours per day do you spend commuting in Beijing (round trip)?

< 0.5 hours 0.25	<input type="radio"/>
0.5-1 0.75	<input type="radio"/>
1-1.5 1.25	<input type="radio"/>
1.5-2 1.75	<input type="radio"/>
2-2.5 2.25	<input type="radio"/>
2.5-3 2.75	<input type="radio"/>
> 3 3.25	<input type="radio"/>

C03

Are you generally satisfied with the environmental conditions in Beijing?

Not satisfied 1	Rather not satisfied 2	Rather satisfied 3	Satisfied 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

C04

Are you a member of an environmental organization or are you regularly engaged in activities protecting or enhancing the environment?

No 0	Yes 1
<input type="radio"/>	<input type="radio"/>

C05

Please indicate to what extent do you agree to the following statements regarding your personal responsibility for climate change:

	Strongly Disagree 1	Disagree 2	Agree 3	Strongly Agree 4
It is pointless if I do something against climate change as an individual C05_01	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't buy fruits and vegetables from far away to save emissions C05_02	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel obliged to consider the climate impact of my daily activities C05_03	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel better when I save emissions C05_04	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a bad conscience when I drive a car instead of using public transport C05_05	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In my daily activities I try to save as many emissions as I can C05_06	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

D01

Please indicate your gender.

Female 1	<input type="radio"/>
Male 0	<input type="radio"/>

D02

Please indicate your marital status.

Single 1	Divorced 2	Married 3	Widow/er 4	Separated 5
<input type="radio"/>				

D03

Please indicate your year of birth.

D04

Please indicate your current living/home address in Beijing (district, street)

D05

Please indicate your highest education level attained.

Not educated 1	<input type="radio"/>
Elementary 2	<input type="radio"/>
Junior High School 3	<input type="radio"/>
Senior High School 4	<input type="radio"/>
Vocational High School 5	<input type="radio"/>
College 6	<input type="radio"/>
University (Bachelor) 7	<input type="radio"/>
University (Master) 8	<input type="radio"/>
University (Doctorate) 9	<input type="radio"/>
Adult Education, Open University, Evening school 10	<input type="radio"/>
Other(s): Please specify 11	

D06

Please indicate which category best describes your current labor or schooling situation?

Working 1	<input type="radio"/>
Job searching 2	<input type="radio"/>
Attending school 3	<input type="radio"/>
Housekeeping 4	<input type="radio"/>
Retired 5	<input type="radio"/>
Sick/disable 6	<input type="radio"/>
On vacation/just graduated 7	<input type="radio"/>
Other(s): Please specify 8	

D07

If it is the case that you work: Please indicate which category best describes your current occupation?

Employed (whole time) 1	<input type="radio"/>
Employed (part time) 2	<input type="radio"/>
Self-employed 3	<input type="radio"/>
Government worker 4	<input type="radio"/>
Casual worker 5	<input type="radio"/>
Other(s): Please specify 6	

D08

Please indicate your current working/studying address in Beijing (district, street)

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D09

Please indicate how many children (younger than 18 years) live in your household?

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D10

Please indicate how many young children (under 6 years old) live in your household?

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D11

Are you a member of communist party of China?

No 0	Yes 1
<input type="radio"/>	<input type="radio"/>

D12

What is your religion?

Buddhist 1	<input type="radio"/>
Taoist 2	<input type="radio"/>
Christian 3	<input type="radio"/>
Catholic 4	<input type="radio"/>
Islam 5	<input type="radio"/>
None 6	<input type="radio"/>
Other(s): Please specify 7	

D13

Please indicate your average monthly wage after taxes.

Less than 1000 RMB 0.5	<input type="radio"/>
1000 to less than 2000 RMB 1.5	<input type="radio"/>
2000 to less than 4000 RMB 3	<input type="radio"/>
4000 to less than 6000 RMB 5	<input type="radio"/>
6000 to less than 8000 RMB 7	<input type="radio"/>
8000 to less than 10000 RMB 9	<input type="radio"/>
10000 to less than 20000 RMB 15	<input type="radio"/>
More than 20000 RMB 25	<input type="radio"/>
Don't know nA	<input type="radio"/>

D14

Please indicate your average monthly household income after taxes (including wages, interests, dividends, real estate income, rent/lease/profit sharing of household assets, retirement pension, scholarship and insurance money)

Less than 1000 RMB 0.5	<input type="radio"/>
1000 to less than 2000 RMB 1.5	<input type="radio"/>
2000 to less than 4000 RMB 3	<input type="radio"/>
4000 to less than 6000 RMB 5	<input type="radio"/>
6000 to less than 8000 RMB 7	<input type="radio"/>
8000 to less than 10000 RMB 9	<input type="radio"/>
10000 to less than 20000 RMB 15	<input type="radio"/>
More than 20000 RMB 25	<input type="radio"/>
Don't know NA	<input type="radio"/>

Leaving the room

Please leave the room only after we invite you to do so. Please take the instructions with you and hand them out to the research assistant who will take care of you at the exit.

We will randomly select one price before you are leaving the room and you will pay for your purchase decision outside the room in case you decided to purchase at the selected price.

Thank you for your participation!

Appendix 3: Descriptive analysis of questionnaire data

The total number of observations is $n = 317$.

Table A3_1 Panel a: Questionnaire A before the decision

Description	Mean	Std.Dev.	Missing
A01: Taking all things together, how happy are you these days? Please tick a box on the scale, where the value 1 means: 'not at all happy' and the value 10 means: 'very happy'.	7.74	1.72	0
A02: All in all, how would you describe your state of health these days? Please tick a box on the scale, where the value 1 means: 'poor' and the value 10 means: 'very good'.	7.44	1.69	1
A03: All things considered, how satisfied are you with your life as a whole these days? Please tick a box on the scale, where the value 1 means: 'completely dissatisfied' and the value 10 means: 'completely satisfied'.	7.19	1.80	0
A04: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? Please tick a box on the scale, where the value 1 means: 'unwilling to take risks' and the value 10 means: 'fully prepared to take risks'.	4.95	2.34	1

Table A3_1 Panel b: Questionnaire A before the decision (1 = Not concerned, 2 = Rather not concerned, 3 = Rather concerned, 4 = Concerned)

Description	Mean	Std.Dev.	Missing
A05: Are you generally concerned about human-induced climate change?	3.31	0.63	0
A06_01: Are you generally concerned about local air pollution in the north (including Beijing) caused by pollutants like for example particulate matter (PM2.5 and PM10), sulfur dioxide, nitrogen dioxide or ozone?	3.74	0.47	0
A06_02: Are you generally concerned about local air pollution in the south (including Shenzhen) caused by pollutants like for example particulate matter (PM2.5 and PM10), sulfur dioxide, nitrogen dioxide or ozone?	2.38	1.00	15

Table A3_1 Panel c: Questionnaire A before the decision (1 = Poorly informed, 2 = Rather poorly informed, 3 = Rather well informed, 4 = Well informed)

Description	Mean	Std.Dev.	Missing
A07_01: How would you describe your knowledge about the following topics? Regarding climate change I am...	2.66	0.67	2
A07_02: How would you describe your knowledge about the following topics? Regarding emissions trading I am...	2.02	0.76	2
A07_03: How would you describe your knowledge about the following topics? Regarding local air pollution I am...	2.61	0.70	0

Table A3_2 Panel a: Questionnaire B after the decision

Description	Min	Q1	Median	Mean	Q3	Max	Std.Dev.	I don't know/Missing
B01 T-BJ: What do you think is the recent price (in RMB) for CO2 certificates in the Beijing emissions trading scheme? n = 222	2	23.75	100	5093.24	300	100000	21020.73	178
B01 T-SZ: What do you think is the recent price (in RMB) for CO2 certificates in the Shenzhen emissions trading scheme?, n = 95	5	35.00	85	195.48	200	2000	432.68	75

Table A3_2 Panel b: Questionnaire B after the decision (answers for T-BJ and T-SZ are pooled). 1 = Not sure, 2 = Rather unsure, 3 = Rather sure, 4 = Sure

Description	Mean	Std.Dev.	Missing
B02: Please indicate how sure you are regarding your price estimate above.	1.67	1.02	16

Table A3_2 Panel c: Questionnaire B after the decision (answers for T-BJ and T-SZ are pooled). 1 = Not at all, 2 = I rather do not trust, 3 = I rather trust, 4 = I trust

Description	Mean	Std.Dev.	Missing
B03: Do you trust in the ability of the Beijing/Shenzhen emissions trading scheme to limit CO2 emissions?	2.37	0.94	0

Table A3_3 Panel a: Questionnaire C after the decision (C01: Please indicate how you most commonly commute within the city?)

Category	Proportion
Driving alone with vehicle	0.101
Carpooling/carsharing	0.000
Driving with motorcycle	0.009
Driving with electric bicycle	0.028
Park and ride	0.019
Public transport	0.644
Taxi	0.000
Cycling	0.129
Walking	0.069
Missing	0.000

Table A3_3 Panel b: Questionnaire C after the decision (C02: Please indicate how many hours per day do you spend commuting in Beijing (round trip)?)

Category	Proportion
[0, 0.5)	0.110
[0.5, 1)	0.287
[1, 1.5)	0.221
[1.5, 2)	0.164
[1, 2.5)	0.126
[2.5, 3)	0.050
>=3	0.038
Missing	0.003

Table A3_3 Panel c: Questionnaire C after the decision. 1 = Not satisfied, 2 = Rather not satisfied, 3 = Rather satisfied, 4 = Satisfied

Description	Mean	Std.Dev.	Missing
C03: Are you generally satisfied with the environmental conditions in Beijing?	1.82	0.72	0

Table A3_3 Panel d: Questionnaire C after the decision. 1 = Yes, 0 = No

Description	Mean	Std.Dev.	Missing
C04: Are you a member of an environmental organization or are you regularly engaged in activities protecting or enhancing the environment?	0.24	0.43	1

Table A3_3 Panel e: Questionnaire C after the decision (C05: Please indicate to what extent do you agree to the following statements regarding your personal responsibility for climate change. 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree)

Description	Mean	Std.Dev.	Missing
C05_01: It is pointless if I do something against climate change as an individual.	1.82	0.89	0
C05_02: I don't buy fruits and vegetables from far away to save emissions.	2.23	0.88	3
C05_03: I feel obliged to consider the climate impact of my daily activities.	3.43	0.68	2
C05_04: I feel better when I save emissions.	3.47	0.63	1
C05_05: I have a bad conscience when I drive a car instead of using public transport.	2.31	0.91	1
C05_06: In my daily activities I try to save as many emissions as I can.	3.54	0.63	0
Personal Norm Scale = Personal.norm = Sum of the values for the last 5 questions above divided by 5.	2.94	0.45	81

Table A3_4 Panel a: Questionnaire D after the decision

Description	Mean	Std.Dev.	Missing
D01: Please indicate your gender. 1 = Female, 0 = Male	0.64	0.48	0

Table A3_4 Panel b: Questionnaire D after the decision (D02: Please indicate your marital status.)

Category	Proportion
Single	0.303
Divorced	0.025
Married	0.656
Widow/er	0.009
Separated	0.006
Missing	0.000

Table A3_4 Panel c: Questionnaire D after the decision

Description	Min	Q1	Median	Mean	Q3	Max	Std.Dev.	Missing
D03: Please indicate your year of birth	1940	1962	1981	1975.77	1989	1998	14.64	2
Age	19	28	36	41.23	55	74	14.64	2

Table A3_4 Panel d: Questionnaire D after the decision (D05: Please indicate your highest education level attained.)

Category	Proportion
Not educated	0.000
Elementary	0.006
Junior High School	0.076
Senior High School	0.126
Vocational High School	0.022
College	0.158
University (Bachelor)	0.397
University (Master)	0.174
University (Doctorate)	0.013
Adult Education, Open University, Evening school	0.028
Other	0.000
Missing	0.000

Table A3_4 Panel e: Questionnaire D after the decision (D06: Please indicate which category best describes your current labor or schooling situation.)

Category	Proportion
Working	0.653
Job searching	0.013
Attending school	0.054
Housekeeping	0.013
Retired	0.259
Sick/disable	0.006
On vacation/just graduated	0.000
Other	0.000
Missing	0.003

Table A3_4 Panel f: Questionnaire D after the decision (D07: If it is the case that you work: Please indicate which category best describes your current occupation?)

Category	Proportion
Employed (whole time)	0.612
Employed (part time)	0.035
Self-employed	0.019
Government worker	0.032
Casual worker	0.054
Other	0.009
Missing	0.240

Table A3_4 Panel g: Questionnaire D after the decision

Description	Min	Q1	Median	Mean	Q3	Max	Std.Dev.	Missing
D09: Please indicate how many children (younger than 18 years) live in your household?	0	0	0	0.29	1	2	0.49	9
D10: Please indicate how many children (younger than 6 years) live in your household?	0	0	0	0.19	0	2	0.43	9

Table A3_4 Panel h: Questionnaire D after the decision

Description	Mean	Std.Dev.	Missing
D11: Are you a member of communist party of China? 1 = Yes, 0 = No	0.32	0.47	0

Table A3_4 Panel i: Questionnaire D after the decision (D12: What is your religion?)

Category	Proportion
Buddhist	0.063
Taoist	0.003
Christian	0.006
Catholic	0.006
Islam	0.003
None	0.861
Other	0.000
Missing	0.057

Table A3_4 Panel j: Questionnaire D after the decision (D13: Please indicate your average monthly wage after taxes.)

Category	Proportion
[0, 1000)	0.019
[1000, 2000)	0.054
[2000, 4000)	0.287
[4000, 6000)	0.199
[6000, 8000)	0.132
[8000, 10000)	0.117
[10000, 20000)	0.110
> 20000	0.022
Missing	0.054

Table A3_4 Panel k: Questionnaire D after the decision (D14: Please indicate your average monthly household Income after taxes (including wages, interests, dividends, real estate income, rent/lease/profit sharing of household assets, retirement pension, scholarship and insurance money))

Category	Proportion
[0, 1000)	0.000
[1000, 2000)	0.013
[2000, 4000)	0.088
[4000, 6000)	0.104
[6000, 8000)	0.148
[8000, 10000)	0.120
[10000, 20000)	0.240
> 20000	0.196
Missing	0.082

Appendix 4: Additional econometric models and estimates**Table A4_1: Logistic regression for treatment effects (T-BJ vs. T-SZ)**

	Model 5	Model 6	Model 7
P	0.973 (0.008)***	0.970 (0.010)***	0.960 (0.012)***
T-BJxP.eol.14	2.390 (0.911)*		
T-BJxP.larger.14	0.877 (0.341)		
T-BJxP.eol.27		1.795 (0.651)	
T-BJxP.larger.27		0.838 (0.401)	
T-BJxP.eol.45			1.476 (0.513)
T-BJxP.larger.45			1.947 (1.562)
Female	0.798 (0.214)	0.801 (0.211)	0.798 (0.208)
Age	0.974 (0.013)	0.974 (0.013)	0.974 (0.013)
Income	1.027 (0.026)	1.026 (0.026)	1.026 (0.026)
Academic.degree	1.817 (0.734)	1.786 (0.709)	1.740 (0.696)
Commuting.time	1.019 (0.147)	1.018 (0.144)	1.016 (0.142)
Religion	2.146 (0.796)*	2.141 (0.788)*	2.138 (0.797)*
Risk	1.257 (0.070)***	1.253 (0.069)***	1.255 (0.069)***
Party	1.363 (0.332)	1.354 (0.324)	1.344 (0.317)
Children.between.6.18	0.319 (0.159)*	0.328 (0.159)*	0.331 (0.158)*
Children.below.6	0.925 (0.296)	0.929 (0.290)	0.927 (0.288)
Trust.in.ETS	2.721 (0.655)***	2.673 (0.629)***	2.650 (0.613)***
Dilemma.awareness	0.884 (0.315)	0.888 (0.308)	0.888 (0.303)
Personal.norm	0.860 (0.247)	0.867 (0.244)	0.872 (0.245)
Concern.climate.change	1.014 (0.253)	1.017 (0.249)	1.021 (0.249)
T-BJxex.conc.poll.north	0.971 (0.158)	0.970 (0.154)	0.975 (0.150)
Num. obs.	1543	1543	1543
Pseudo R2	0.313	0.304	0.300

Note: ***p < 0.001, **p < 0.01, *p < 0.05. Purchase of certificate is the dependent variable, coefficients are presented as odds ratios. Standard errors in parenthesis are corrected for clustered observations in model 5-7.

Table A4_2: Average marginal effects and elasticities

prices	All observations		T-BJ		T-SZ	
	<i>ME</i>	η_{Pr}	<i>ME</i>	η_{Pr}	<i>ME</i>	η_{Pr}
[2, 14]	-0.027** (0.003)	-0.752** (0.118)	-0.034** (0.004)	-0.935** (0.154)	-0.017** (0.005)	-0.612** (0.212)
[2, 45]	-0.011** (0.001)	-1.117** (0.134)	-0.012** (0.001)	-1.209** (0.174)	-0.008** (0.001)	-1.110** (0.211)
[2, 300]	-0.005** (0.001)	-2.542** (0.571)	-0.006** (0.001)	-3.015** (0.754)	-0.003** (0.001)	-2.015* (0.852)

Note: Average marginal effect of the price on the probability to buy (*ME*) and average elasticity of the probability of contributing (η_{Pr}). Specification with price and socio-economic covariates as the explanatory variables (model 4 in Table 3 (Panel a), except for the interaction variable between the T-BJ dummy variable and the price). Standard errors in parentheses are corrected for clustered observations. **p < 0.01, *p < 0.05.

Appendix 5: Calculation of the Lower-Bound Turnbull WTP

The lower-bound Turnbull (*LBT*) is computed in the following steps (see Haab and McConnell 2003):

1. Calculate for each bid level t_j , $j = 1, \dots, M$, the share of no answers: $F_j = N_j/T_j$.
2. Compare F_j with F_{j+1} , if $F_j < F_{j+1}$ continue, if $F_j \geq F_{j+1}$, these cells are pooled and the combined no shares of these cells calculated: $F_j^* = N_j^*/T_j^*$.
3. This is repeated until a monotonously increasing cdf is formed. Set $F_{M+1}^* = 1$.
4. Calculate $f_{j+1}^* = F_{j+1}^* - F_j^*$ for each bid level t_j . This corresponds to a consistent estimator of the probability that WTP falls between the price j and price $j + 1$.
5. Multiply every bid with the according probability that WTP falls between this bid and the next higher bid.
6. Sum over the quantities of step 5 to obtain lower bound Turnbull WTP, which is then: $E_{LBT}(WTP) = \sum_{j=0}^M t_j (F_{j+1}^* - F_j^*)$, and can be interpreted analogous to the consumer surplus as sum of the marginal value multiplied by the adapted quantities, or the integer over the quantity of a demand curve.
7. Calculate the variance: $V(E_{LBT}) = \sum_{j=1}^{M^*} \frac{F_j^*(1-F_j^*)}{T_j^*} (t_j - t_{j-1})^2$, where T_j^* is the common amount of observations of the eventually pooled bid cell.

Table A5_1: Lower-bound Turnbull WTP for all observations

t_j	N_j	T_j	F_j	F_j^*	f_j^*	E_{LBT}	$V(E_{LBT})$
2	73	156	0.468	0.454	0.454	0.000	0.003
5	71	161	0.441	P			
9	104	156	0.667	0.667	0.212	0.425	0.070
14	116	161	0.720	0.720	0.054	0.484	0.031
20	119	156	0.763	0.763	0.042	0.593	0.042
27	129	161	0.801	0.801	0.038	0.768	0.048
35	140	156	0.897	0.880	0.079	2.130	0.021
45	139	161	0.863	P			
70	150	156	0.962	0.946	0.066	2.319	0.196
100	150	161	0.932	P			
200	156	156	1.000	0.994	0.047	3.312	0.334
300	159	161	0.988	P			
			1.000	1.000	0.006	1.262	
	1506	1902			1.000	11.293	0.746

Note: p = pooled category.

Linearly interpolated median = $2 + (0.5 - 0.454) * (9 - 2) / (0.667 - 0.454) = 3.51$.

Table A5_2: Lower-bound Turnbull WTP for T-BJ

t_j	N_j	T_j	F_j	F_j^*	f_j^*	E_{LBT}	$V(E_{LBT})$
2	44	107	0.411	0.401	0.401	0.000	0.004
5	45	115	0.391	p			
9	68	107	0.636	0.636	0.235	0.469	0.106
14	82	115	0.713	0.713	0.078	0.698	0.044
20	80	107	0.748	0.748	0.035	0.485	0.063
27	92	115	0.800	0.800	0.052	1.047	0.068
35	96	107	0.897	0.878	0.078	2.116	0.031
45	99	115	0.861	p			
70	103	107	0.963	0.950	0.072	2.523	0.260
100	108	115	0.939	p			
200	107	107	1.000	0.995	0.045	3.153	0.341
300	114	115	0.991	p			
			1.000	1.000	0.005	0.901	
	1038	1332			1.000	11.391	0.919

Note: p = pooled category.

Linearly interpolated median = $2 + (0.5 - 0.401) * (9 - 2) / (0.636 - 0.401) = 4.95$.**Table A5_3: Lower-bound Turnbull WTP for T-SZ**

t_j	N_j	T_j	F_j	F_j^*	f_j^*	E_{LBT}	$V(E_{LBT})$
2	29	49	0.592	0.579	0.579	0.000	0.010
5	26	46	0.565	p			
9	36	49	0.735	0.735	0.156	0.311	0.195
14	34	46	0.739	0.739	0.004	0.040	0.105
20	39	49	0.796	0.796	0.057	0.795	0.119
27	37	46	0.804	0.804	0.008	0.169	0.168
35	44	49	0.898	0.884	0.080	2.156	0.069
45	40	46	0.870	p			
70	47	49	0.959	0.937	0.053	1.842	0.763
100	42	46	0.913	p			
200	49	49	1.000	0.989	0.053	3.684	1.853
300	45	46	0.978	p			
			1.000	1.000	0.011	2.105	
	468	570			1.000	11.103	3.282

Note: p = pooled category.

Linearly interpolated median = $0.5 * 2 / 0.579 = 1.73$.

Appendix 6: Additional tables**Table A6_1: Basic facts on Beijing and Shenzhen ETS**

ETS	Annual cap in mtCO ₂	Covered entities	Main sectors covered	Average price in RMB/tCO ₂
Beijing	55	543	Electricity, heating, cement, petrochemical and other industries, large public buildings	49
Shenzhen	30	635	Electricity, building, manufacturing, water supply	29

Sources: Zhang, Wang and Du (2017) and personal communication with staff from the Shenzhen ETS. Data for 2016.

Table A6_2: Proportion of subjects who buy

P	p_{T-BJ}^{cert}	n	p_{T-SZ}^{cert}	n	p-value
2	0.589	107	0.408	49	0.040
5	0.609	115	0.435	46	0.054
9	0.364	107	0.265	49	0.273
14	0.287	115	0.261	46	0.847
20	0.252	107	0.204	49	0.550
27	0.200	115	0.196	46	1
35	0.103	107	0.102	49	1
45	0.139	115	0.130	46	1
70	0.037	107	0.041	49	1
100	0.061	115	0.087	46	0.512
200	0.000	107	0.000	49	NA
300	0.009	115	0.022	46	0.491
Total	0.221	1332	0.179	570	0.042

Note: Two-sided Fisher exact test for count data. p_{T-BJ}^{cert} (p_{T-SZ}^{cert}) is the proportion of subjects who buy at this price in T-BJ (T-SZ).

Table A6_3: Mean expectations regarding the percentage of other subjects who buy

P	Exp_{T-BJ}	Exp_{T-SZ}	t-value	df	p-value
2	70.61	47.28	-3.09	93.00	0.003
5	63.89	46.52	-2.49	91.16	0.015
9	57.02	34.96	-2.93	92.27	0.004
14	43.72	31.91	-1.71	94.45	0.091
20	44.57	31.45	-1.83	91.64	0.071
27	31.50	20.54	-1.93	97.97	0.057
35	26.98	18.70	-1.47	92.46	0.144
45	23.06	14.41	-1.77	97.72	0.080
70	15.48	9.41	-1.58	89.53	0.117
100	12.30	7.26	-1.53	94.55	0.130
200	9.26	1.75	-2.92	50.85	0.005
300	6.24	2.46	-1.59	83.29	0.116

Note: Two-sided t-test. Exp_{T-BJ} (Exp_{T-SZ}) is the mean percentage of individual expectations at this price regarding the share of other participants who buy in T-BJ (T-SZ).

Table A6_4: Summary of socio-economic covariates

Variable	Mean	Std.Dev.	Min	Max
Female	0.64	0.48	0	1
Age (in years)	41.23	14.63	19	77
Income (in 1,000 RMB)	6.50	4.87	0.50	25.00
Academic degree	0.58	0.49	0	1
Religion	0.09	0.28	0	1
Risk (in [1,10])	4.93	2.34	1	10
Party	0.32	0.47	0	1
Children between 6 and 18 years	0.08	0.28	0	1
Children below 6 years	0.18	0.38	0	1
Commuting time (in hours)	1.36	0.78	0.25	3.25
Concern for climate change	0.39	0.49	0	1
Concern pollution (north)	0.75	0.43	0	1
Concern pollution (south)	0.18	0.39	0	1
Dilemma awareness	0.22	0.42	0	1
Personal norm (in [1,4])	2.99	0.49	1.40	4.00
Trust in ETS	0.42	0.49	0	1

Note: The covariates contain age (in years) and income (in 1,000 RMB); the binary variables are for female, academic degree, religion, membership to the communist party and for having children below 6 years of age and between 6 and 18 years of age. Furthermore, commuting time (in hours) and risk preference (in [1, 10], from 1 (unwilling to take risks) to 10 (fully prepared to take risks)) are included. Concern for climate change (pollution (north), pollution (south)) indicates as a binary variable whether subjects are concerned about climate change (pollution in the north, pollution in the south). Dilemma awareness is a binary variable for agreement with the statement "It is pointless to try to do something against climate change as an individual." Personal norm (in [1, 4]) measures the degree of pro-environmental behavior with the personal norm scale (for questions and scale properties see Appendix 3, Table A3_3 Panel e). Trust in the ETS is a binary variable that measures whether subjects trust that the ETS is fit to reduce CO₂ emissions.